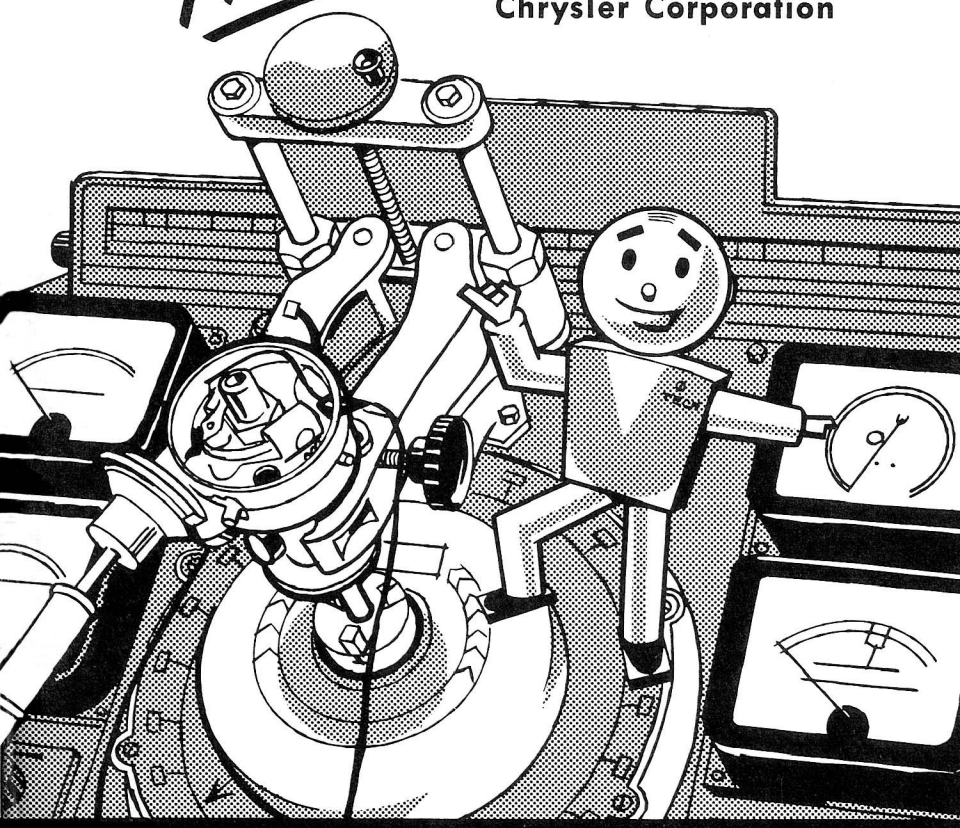
SERVICE REFERENCE BOOK

of the MASTER TECHNICIANS SERVICE CONFERENCE

SESSION NO. 136

THE NEW DISTRIBUTOR

Built by
Chrysler Corporation

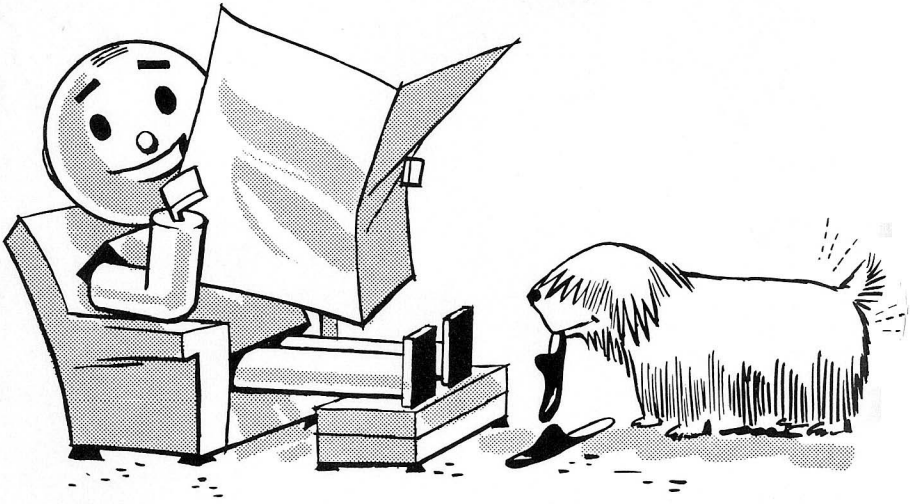


PREPARED BY CHRYSLER CORPORATION

Plymouth • Dodge • De Soto • Chrysler • Imperial

Tech Sez:

"FEEL AT HOME WITH THE NEW DISTRIBUTOR!"



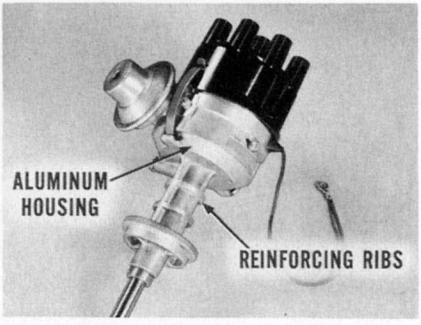
You'll soon see a lot of the new distributors built by the Chrysler Corporation. You'll see them first on Plymouth, and then on other makes. So, it's time you got acquainted.

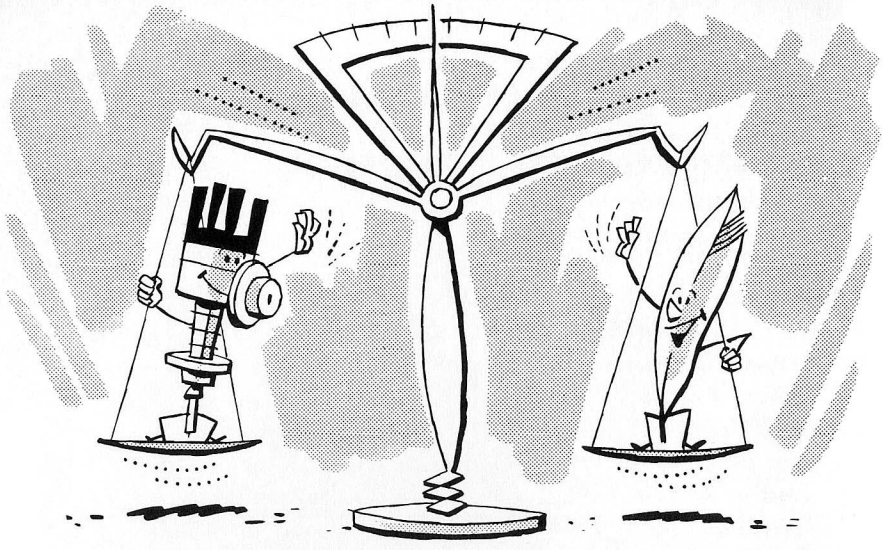
Actually, you'll feel quite at home with most of the new distributor changes because they're similar to the many features you already know so well. This reference book covers all the improvements plus service procedures you'll find useful in your daily work.

Here's where to look for the information you need when you want it:

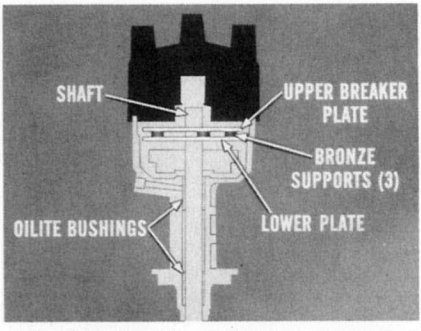
DESCRIPTION

Housing. You'll have no trouble spotting the new distributor. The outstanding feature is the aluminum housing. Reinforcing ribs on the aluminum housing provide a very distinctive look. What's more, when you remove the new distributor, you'll notice that it's a lot lighter. Actually, it's about half the weight of the distributors you're familiar with.





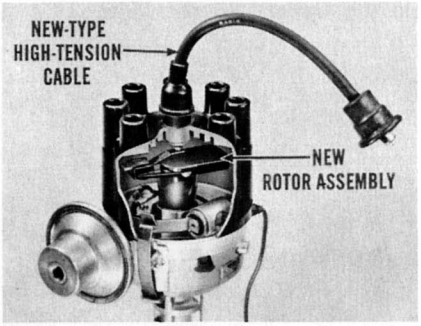
Another difference you'll recognize is in the hold-down clamp. Ends of the prongs are turned up to prevent gouging of the aluminum housing flange. Be sure to use this clamp with the new distributor. If you have to replace the distributor with one of another make, you'll also have to use the former type hold-down clamp.



The distributor shaft is fitted in Oilite bushings which are pressed into the housing. These bushings are identical, by the way, and have the same diameters (I.D. and O.D.) as those on previous installations.

The upper breaker plate, on which the contact points and condenser are mounted, slides on three bronze bearing supports in the lower plate. They insure smooth movement of the upper plate.

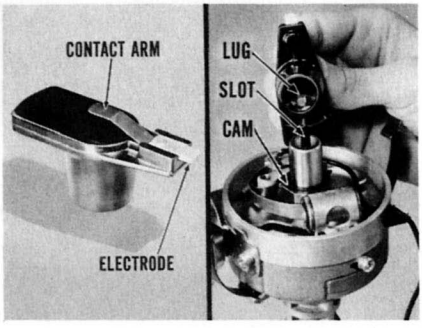
Distributor Cap. As you remove the cap, you'll notice that the center carbon contact is staked in a fixed position in the terminal insert. It isn't spring-loaded and doesn't contain a resistor. Instead, the resistance is controlled by the new resistance-type high-tension coil cable, marked "RADIO". Spring action, formerly in the center terminal, is provided by a new rotor assembly design. The distributor cap has an indexing cutout in its lower rim. This cutout fits over a tab on the vacuum control assembly to position the cap properly.



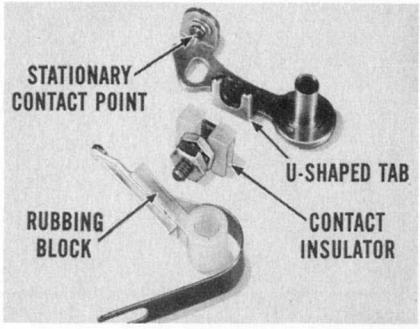
NOTE: On Plymouth cars, resistor-type plugs will have regular cables. Only the center cable from coil to distributor cap will be the "RADIO" type.

Two coil cable service packages are available. One, 17″ long, is available under the Part No. 2084428; the other, 15″ long, can be ordered under Part No. 2084427. The package contains wire, two terminals, two nipples and one sleeve. The complete spark plug cable set, resistance type, is available under Part No. 2084023.

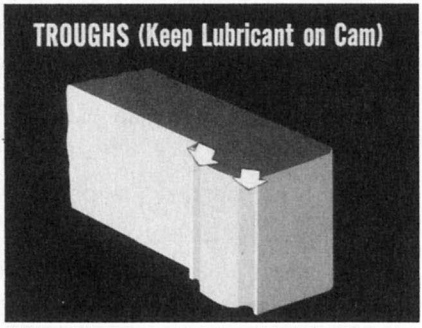
Rotor. The new rotor has a spring-steel contact arm that is held against the center carbon contact when the cap is in place. The rotor electrode is attached to the arm and body by a spun-over eyelet. Inside the rotor body, a molded driving lug is provided to slide into a slot in the top of the cam. This lug does the same job done by the flat surface you've noticed on other rotors.



Breaker Contact Set. One of the important changes is that the breaker contact set comes as a unit. It consists of the movable point and the stationary point and insulator. A sleeve, at one end of the adjustable bracket, fits over and pivots on a mounting pin located on the upper breaker plate. This sleeve also serves as the pivot for the movable contact arm. The stationary contact point is on the opposite end of the adjustable bracket. A vertical U-shaped tab, in the center, supports the insulator. The movable point arm has a new nylon rubbing block. The block, spring and arm are secured by four spun-over eyelets.



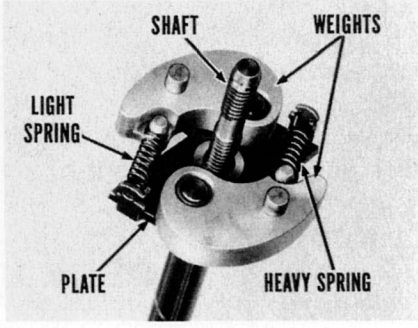
The new nylon rubbing block is lighter, stronger, and less apt to expand or contract due to changes in temperature. Contact area of the block is brand-new in design. Two troughs, formed by tiny ridges, are on each side of the contact surface. These troughs keep lubricant on the cam—where it belongs. That results in less rubbing block wear, and less change in gap due to progressive wear. In addition, the troughs help to prevent lubricant from getting on the contact points.



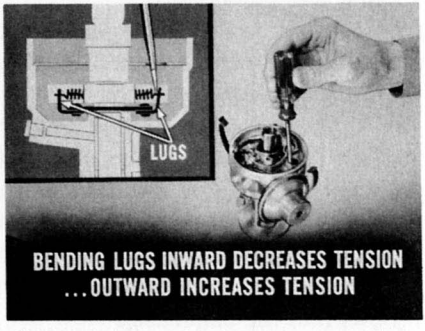
Lightness of the nylon rubbing block, naturally, means a lighter contact assembly. This reduces contact point bounce during high engine speeds. That results in full dwell, a saving in fuel, and better all-around engine performance.

Breaker Plate Assembly. An upper, rotating plate and a lower, stationary plate are held together under spring tension to prevent chatter. A Y-shaped spring attached under the lower plate by a pivot pin, supplies the tension. Two screws hold the lower plate to the housing.

Centrifugal Advance. This is made up of an advance plate attached to the upper end of the shaft. It carries two governor weights which are of zinc, and are die-cast in one piece instead of being laminated steel construction. Oilite bearings, pressed in the large end of the weights, provide smooth pivoting operation. A pin on top of each weight operates in the cam yoke slot to limit outward swing. Coil springs of different tensions are attached to the inside edges of the small ends of the weights and control how fast the weights swing outward. The light spring controls advance for low-speed operation. The heavier spring controls high-speed advance.



Governor weight spring tension is adjustable. By using a screwdriver through an access hole in the lower plate, you can bend the lugs inward to decrease spring tension, outward to increase tension.



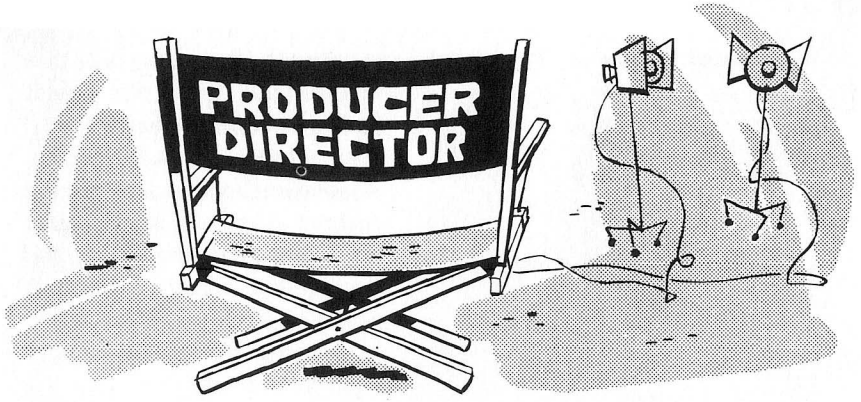
Vacuum Control Assembly. The vacuum control advances the ignition timing according to throttle opening at light load operation, and prevents too much advance under heavy load conditions. On the new distributor, the vacuum control assembly comes as a precision, pre-set unit. It is sealed when made, and is not adjustable.

Ventilation. Most technicians know that the distributor has to operate in a range from idle speed to about 12,000 sparks per minute when maintaining turnpike speeds. All this sparking inside the distributor creates ozone. When ozone combines with moisture, it has a corrosive effect on distributor parts. So drain holes are provided in the housing floor to let condensation escape to prevent corrosion and ventilate the unit. Never let these holes get plugged up.

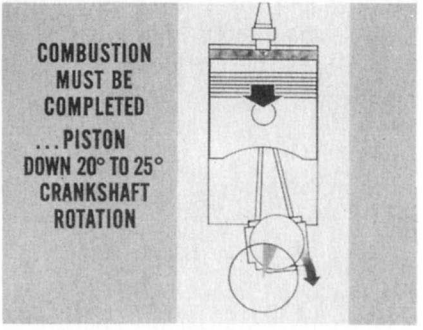
OPERATION

A review of distributor operation will be helpful in diagnosing possible malfunctions. For instance, the distributor has two jobs to perform. Its first job is to interrupt current to the primary coil windings and thus produce high voltage which it distributes to the spark plugs. Its second job is to distribute this voltage at the right time, according to piston position, speed and load.

High voltage, as you know, is created in the secondary circuit as the cam lobe opens the contact points. This breaks the primary circuit. The magnetic field in the coil collapses quickly. This rapid change creates a high voltage in the secondary—enough to jump the spark plug gap. And, as the opened points cut off the primary circuit, it flows into the condenser.



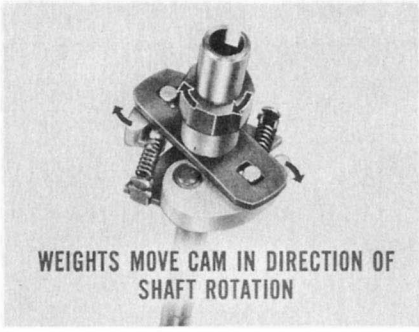
The job of distributing the high voltage to the spark plugs at the right time is vitally important to engine performance. You probably know that combustion must be completed by the time the piston has moved downward about 20° to 25° of crankshaft rotation. The spark, therefore, must take place far enough in advance of that piston position to allow time for the mixture to burn.



A spark *too far ahead* of top center will create combustion pressure before the piston can start down on its power stroke. That would retard piston travel and probably result in a knock you could hear. A spark *after* top center would create pressure too late. The piston, in this case, would be too far down on its power stroke. Much of the power would be wasted. Besides that, oil on the cylinder walls would be burned off. That would lead to excessive wear of the rings and cylinder walls.

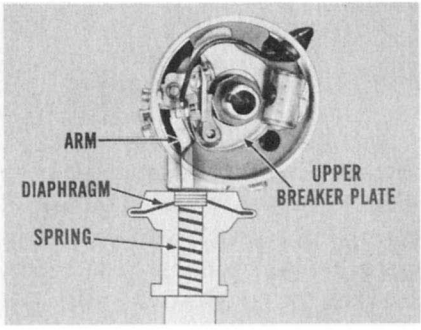
Proper timing, then, is important to performance as well as engine life. And that's why the mechanical and vacuum advance features of the distributor are needed, since they vary timing automatically to meet all operating conditions.

Mechanical Advance. Two centrifugal weights drive the cam that opens and closes the points as the distributor shaft rotates. The springs control the rate of outward movement of the weights. And as the weights move outward, they move the cam in the direction of shaft rotation. This makes the lobes meet the rubbing block sooner —advancing engine timing.



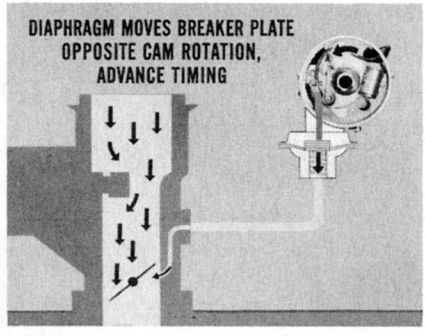
As engine speed slows down, centrifugal force isn't great enough to overcome spring tension. So the springs return the weights to the no-advance position.

Vacuum Advance. Vacuum advance comes in during a light-load, part-throttle condition while engine vacuum is fairly high. In the sealed unit on the new distributor, there's a vacuum diaphragm and spring. An arm, connected to the diaphragm, is also connected to the upper breaker plate that carries the points.



Vacuum comes through a tube connected between the vacuum chamber and a port in the carburetor throttle body. The port is drilled above the throttle valve. When the valve is closed, there's no vacuum at the port. Since no vacuum will reach the diaphragm, the breaker plate won't move.

But when the valve opens, the port is open to manifold vacuum. This draws the diaphragm against spring pressure, pulls the arm, and moves the breaker plate in a direction *opposite* that of cam rotation. The rubbing block then meets the cam lobes sooner, and advances timing.



Now, as the throttle opens wider, vacuum falls off at the port. Spring tension pushes the diaphragm back, and moves the breaker plate in the direction of cam rotation to *retard* timing. This prevents knocking due to timing being advanced too far according to throttle opening and engine load.

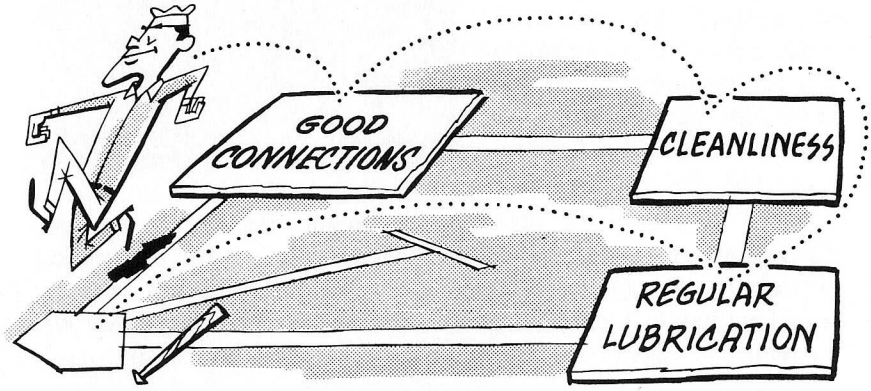
Ballast Resistor. While the ballast resistor isn't part of the distributor, it has an important effect on the life of the contact points. The ballast resistor is wired between the ignition switch and the coil positive terminal. Its job is to control the flow of primary current to the distributor. During low-speed operation, the contact points remain closed for a longer time. This lets current flow through the resistor longer and heats it up. Heating the resistance coil in the resistor reduces current flow to the points and minimizes their tendency to burn.

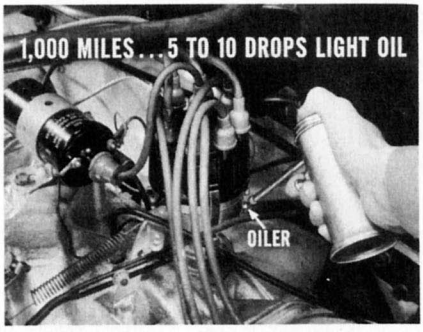
At higher engine speeds, contact points are closed for a shorter time. The current doesn't have time to heat up the resistor. Because the resistor stays cooler, its resistance is reduced, and flow of current is increased. This insures a maximum voltage at the spark plugs, and results in improved high-speed operation.

If you should have a hard-starting problem, try jumping the connections of the ballast resistor. If the car starts, you'll know the ballast resistor connections are excessively corroded, or the resistor is faulty and may need to be replaced.

MAINTENANCE

To keep the new distributor performing up to standard, look after the usual periodic services. Regular lubrication, cleanliness, and good connections, for example, are the main service bases to tag.





Lubrication. Every 1,000 miles, put five to ten drops of light engine oil in the oiler. That will lubricate the shaft bearings. At the same time, wipe the cap clean. Oil, grease, or moisture between the terminals may cause cross-firing. Check the cables for firm seating in the terminals.

NOTE: Remember to remove cables by pulling them straight out of the towers. Yanking them out can stretch the conducting material, and increase cable resistance.

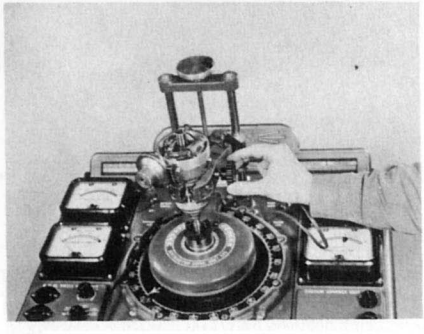
Every 10,000 miles, remove the cap and rotor. Put two or three drops of light engine oil on the felt in top of the cam. Above all, don't over-oil the felt.

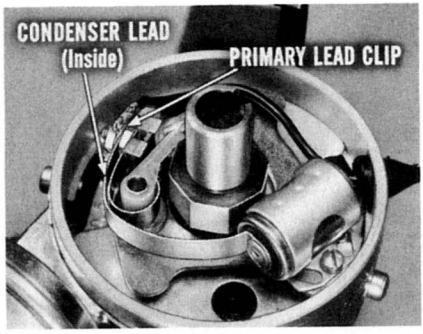
In addition, wipe the cam clean. Then put a light coat of approved cam lubricant on your finger. Hold it against the cam as you turn the shaft to get an even film of lubricant on all surfaces. Over-lubrication will splatter around inside, may get on the points and cause them to burn.

Breaker Contact Set. Examine the breaker points each time you lubricate the distributor. If points are frosty-gray, they're all right. But if you find them badly pitted, or badly discolored, you'd better replace them. Do not attempt to remove the movable arm from its pivot. You'll notice that the pivot is spun over after the arm is installed. If you try to remove the arm you will damage the set. Replace the complete breaker contact set.

Always test condenser capacity, minimum series resistance, and leakage (insulation breakdown resistance) on a tester. Correct capacity range for the condenser is .25 to .285 microfarads.

Remove the distributor and clamp it in the distributor tester to replace the contact set. Clamp around the ribbed section, being careful not to crush the ribs. Contact sets, by the way, come pre-aligned and with spring tension pre-adjusted. Use a narrow-blade screwdriver to install them and don't let the screwdriver slip. A wide-blade tool might bend the pre-aligned contact arm.





Try not to disturb the inner nut on the insulator screw. It secures spring tension. So, if the nut is loosened, you'd have to check and readjust spring tension. The condenser lead and primary lead clips, remember, go between the two nuts. And the condenser lead should be kept on the inside.

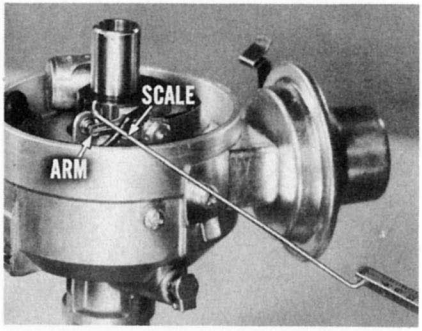
After installing the points, see that the gap is set at .015″ to .018″. Spring tension should be 17 to 20 ounces, and cam dwell should be 27° to 32°.

Use a flat feeler gauge or a dial indicator to check new points. Always use a dial indicator to check the gap on *used* points.

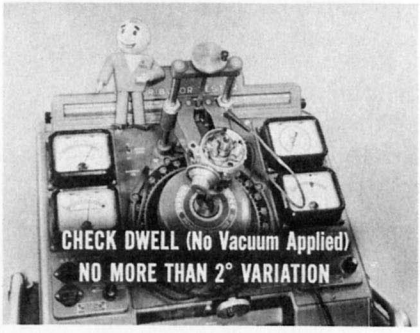
NOTE: Don't forget to *clean the points*. Draw a piece of linen tape between them to remove any dirt, oil, or perspiration from handling. Actually, you should never touch the points. Foreign matter of any kind on them will make them burn.

Checking Spring Tension. Too much spring tension will accelerate wear on the rubbing block and cam. Tension too low will cause a flutter at high speeds and result in misfiring. When you check spring

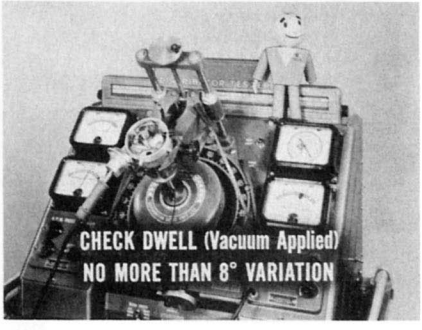
tension, hook the scale over the arm just inside the contact point. Pull at right angles to the contact surface. Take your reading just as the points separate, or as your test light lights. If you don't get 17 to 20 ounces, you can adjust spring tension by loosening the inner and outer nuts on the insulator screw. Slide the spring in or out as needed, tighten the nuts and recheck tension.



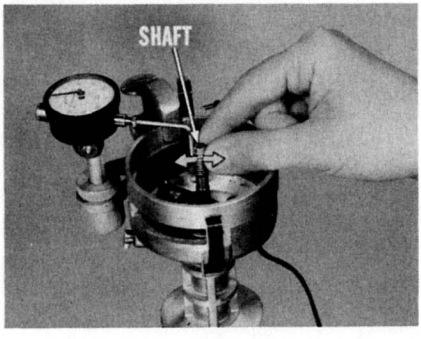
Cam Dwell. Check dwell at idle speed, and at 2000 r.p.m. with no vacuum applied. There shouldn't be more than 2° variation.



Check dwell next at idle and 2000 r.p.m. with vacuum. There shouldn't be more than 8° variation with vacuum connected. If you find too much dwell variation, look for one, or a combination of these causes: worn rubbing block—rubbing block not square with the cam—a worn cam—a worn breaker plate assembly—wear on the distributor shaft and bushings.



Use a dial indicator to check further on the cause of dwell variation. Remove the cam, breaker plate assembly and centrifugal advance mechanism from the distributor. Then, attach the dial indicator.



Move the shaft to and from the indicator with just enough pressure to measure movement. Too much pressure will spring the shaft and cause a false reading. If there's more than .008″ total movement, replace the shaft and the bushings.

Here's one important thing to keep in mind when checking dwell, or cam angle. The distributor cam must rotate 360° (one full revolution) to fire all cylinders of the engine. In a V-8 engine, this means that 45° (⅛ of the complete circle) is allotted to each cylinder.

During a part of that 45°, the points are closed. That's when the ignition coil is building up its high voltage so enough will be available to jump the spark plug gaps. While cam angle is specified at 27° to 32°, it is determined by contact point gap. Any deviation from the proper gap setting will be reflected in cam angle reading. If dwell seems out of range, recheck the gap at the points.

Before you reinstall the distributor in the engine, be sure to check centrifugal and vacuum advance characteristics. This has to be done on a tester.

Centrifugal Advance. With the distributor mounted in a tester, drive it in a clockwise direction. Check distributor r.p.m.'s against the degree of advance, and compare it with the specifications listed in the following table:

CENTRIFUGAL ADVANCE		
Distributor Degrees		**Distributor R.P.M.**
0°	@	**330 to 560**
0° to 2°	@	**560**
2° to 4°	@	**800**
3° to 10°	@	**2300**

If degrees of advance are high at low speeds, the light-spring tension is too low. The weight is being allowed to swing outward too rapidly. So bend the light-spring lug on the advance plate *outward* to put more tension on the spring. Take it easy, though. Only a slight bending is enough to change advance characteristics.

If degrees of advance were too low, you'd bend the light-spring lug inward to reduce spring tension.

At higher speeds, if advance is too great, bend the lug for the heavier spring *outward* to increase spring tension. If readings are too low at higher speeds, bend the lug inward to reduce spring tension.

If you find too much variation in check points between increase and decrease readings, check alignment of weights on the advance plate. Also, check lubrication of the weight pivots. Use Lubriplate, if lubrication is required.

Vacuum Advance. Connect the tester's vacuum pump line to the advance unit, and turn the pump control to give a reading of 10 to 20 inches of vacuum.

Turn off the pump and see if the advance unit holds this reading. If it falls off, there's a leak in the diaphragm, vacuum chamber, connections or gauge. In this case, check for the cause of the drop and correct it before you go ahead with the test.

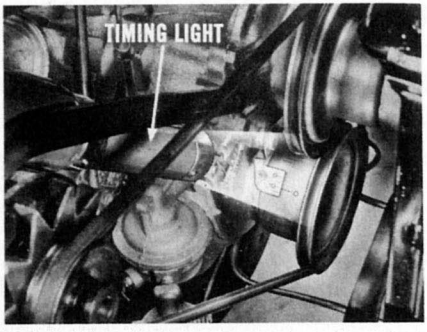
If the gauge holds its reading, run the distributor at about 800 r.p.m. where the reading will be steady. With the indicator set at zero, apply vacuum to get the first advance figure on the following table:

VACUUM ADVANCE		
Distributor Degrees		**Inches of Vacuum**
0°	@	**6.2" to 7.3"**
7.5° to 10°	@	**12"**
12° to 14.75°	@	**16"**

If the first figures check satisfactorily, check the remainder. But if readings are erratic, the diaphragm arm might be out of alignment, the upper plate might be sticking, or the diaphragm might be faulty. In a case like this, check the cause and correct it. If the trouble is in the vacuum control unit, replace it with a new unit, as it is serviced only as an assembly.

If advance characteristics are greater than specified, the diaphragm spring might be too weak. If advance is too slow, it means that the spring is too strong. Check for correct calibration by referring to the part number stamped on the front face of the control unit. If it is the correct unit for that distributor, and advance characteristics are still different from those specified, replace the control unit. If it is not the correct unit, get the correct one, and install it.

Ignition Timing. Install the distributor in the engine and draw down the hold-down clamp bolt just enough to hold the distributor snugly. Do not connect the vacuum advance control tube.



Run the engine until it warms up to normal operating temperature and set it at slow idle speed. Connect a timing light and check the ignition timing. The timing light should flash the instant the mark on the pulley is opposite the 10° BTDC mark on the timing chain case

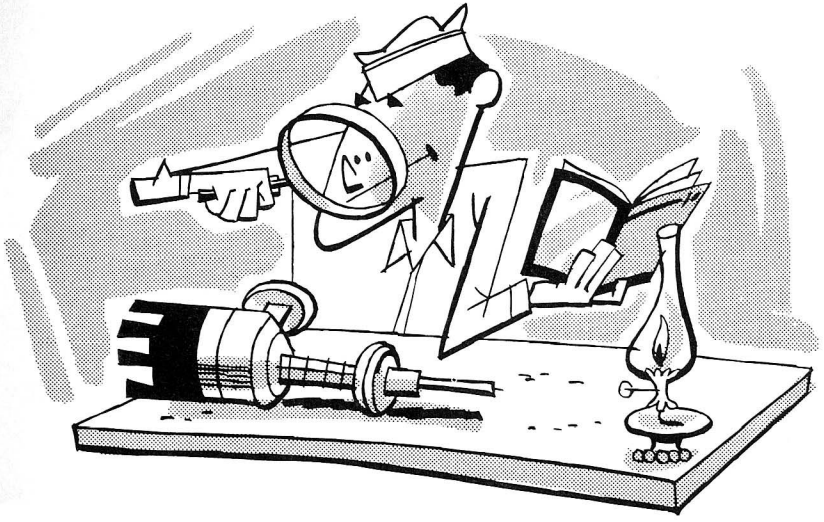
bracket. If it doesn't, rotate the distributor *counterclockwise to advance—clockwise to retard* timing. Once timing is adjusted to 10° BTDC, tighten the clamp bolt and connect the vacuum advance tube.

NOTE: Connect the vacuum line carefully so no threads in the vacuum housing will be stripped.

SUMMARY

Your best bet to score a hit with your many service customers is to stay abreast of all the latest ignition improvements. Information in this book on the new Chrysler Corporation-built distributor is specially designed to keep you up-to-the-minute on a part you'll find on more Plymouth V-8 engines every day.

So get acquainted with the differences, as well as the service procedures affected. Time spent in study now will pay off in easier, faster work, and will add to your good service reputation.



RECORD YOUR ANSWERS TO THESE QUESTIONS ON QUESTIONNAIRE NO. 136

In the new distributor cap, the center carbon contact is spring-loaded and contains a resistor as on other types.	RIGHT	1	WRONG
One important service feature of the new distributor is that the breaker contact set is serviced as a unit.	RIGHT	2	WRONG
The nylon rubbing block on the movable arm is designed to provide better lubrication of the cam surface.	RIGHT	3	WRONG
The new vacuum advance control assembly is a precision pre-set unit that's sealed when made, and is not adjustable.	RIGHT	4	WRONG
As the governor weights swing outward, they move the cam in the direction of shaft rotation, to advance engine timing.	RIGHT	5	WRONG
The vacuum advance unit moves the breaker plate in a direction opposite that of cam rotation to advance timing.	RIGHT	6	WRONG
When engine vacuum is low, spring tension in the vacuum advance unit moves the breaker plate in the same direction as cam rotation to retard timing.	RIGHT	7	WRONG
Point sets come pre-aligned and with spring tension pre-adjusted, but you must always set the gap to specifications.	RIGHT	8	WRONG
Set point gap .015″ to .018″, spring tension 17 to 20 ounces, and cam dwell 27° to 32°.	RIGHT	9	WRONG
Check dwell at idle speed and 2000 r.p.m. to see that it varies no more than 2° with no vacuum applied, and no more than 8° with vacuum applied.	RIGHT	10	WRONG

Litho in U.S.A.